

[0163] In an example embodiment, the optical axis of the image capture units 260 is parallel or nearly parallel (e.g. up to 1, 2, 3, 4 or 5 degrees difference) when the pair of digital images are taken. In case that the imaging apparatus 200 is equipped with optical image stabilization for at least one of the image capture units, the optical axis of each image capture unit 260 can be determined at the center position provided by the optical image stabilization.

[0164] In an example embodiment, the image capture units 260 are identical in terms of any the following functionalities they may have: focal length; image capture angle; automatic exposure control; automatic white balance control; and automatic focus control. In an example embodiment, the image capture units 260 share common control in one or more of these functionalities. In another example embodiment, however, the camera units differ with one or more of these functionalities. Software matching is performed as appropriate according to desired implementation to an image formed in combination of information. Such matching can be directed only on desired crop area.

[0165] Term host processor refers to a processor in the apparatus 200 in distinction of one or more processors in the digital image capture unit 260, referred to as camera processor(s) 330 in FIG. 3. Depending on implementation, different example embodiments of the invention share processing of image information and control of the imaging unit 300 differently. Also, the processing is performed on the fly in one example embodiment and with off-line processing in another example embodiment. It is also possible that a given amount of images or image information can be processed on the fly and after that off-line operation mode is used as in one example embodiment. The on the fly operation refers e.g. to such real-time or near real-time operation that occurs in pace with taking images and that typically also is completed before next image can be taken.

[0166] It shall be understood that any coupling in this document refers to functional or operational coupling; there may be intervening components or circuitries in between coupled elements.

[0167] The communication interface module 220 is configured to provide local communications over one or more local links. The links may be wired and/or wireless links. The communication interface 220 may further or alternatively implement telecommunication links suited for establishing links with other users or for data transfer (e.g. using the Internet). Such telecommunication links may be links using any of: wireless local area network links, Bluetooth, ultra-wideband, cellular or satellite communication links. The communication interface 220 may be integrated into the apparatus 200 or into an adapter, card or the like that may be inserted into a suitable slot or port of the apparatus 200. While FIG. 2 shows one communication interface 220, the apparatus may comprise a plurality of communication interfaces 220.

[0168] Any processor mentioned in this document is selected, for instance, from a group consisting of at least one of the following: a central processing unit (CPU), a micro-processor, a digital signal processor (DSP), a graphics processing unit, an application specific integrated circuit (ASIC), a field programmable gate array, a microcontroller, and any number of and any a combination thereof. FIG. 2 shows one host processor 210, but the apparatus 200 may comprise a plurality of host processors.

[0169] As mentioned in the foregoing, the memory 240 may comprise volatile and a non-volatile memory, such as a

read-only memory (ROM), a programmable read-only memory (PROM), erasable programmable read-only memory (EPROM), a random-access memory (RAM), a flash memory, a data disk, an optical storage, a magnetic storage, a smart card, or the like. In some example embodiments, only volatile or non-volatile memory is present in the apparatus 200. Moreover, in some example embodiments, the apparatus comprises a plurality of memories. In some example embodiments, various elements are integrated. For instance, the memory 240 can be constructed as a part of the apparatus 200 or inserted into a slot, port, or the like. Further still, the memory 240 may serve the sole purpose of storing data, or it may be constructed as a part of an apparatus serving other purposes, such as processing data. Similar options are thinkable also for various other elements.

[0170] A skilled person appreciates that in addition to the elements shown in FIG. 2, the apparatus 200 may comprise other elements, such as microphones, displays, as well as additional circuitry such as further input/output (I/O) circuitries, memory chips, application-specific integrated circuits (ASIC), processing circuitry for specific purposes such as source coding/decoding circuitry, channel coding/decoding circuitry, ciphering/deciphering circuitry, and the like. Additionally, the apparatus 200 may comprise a disposable or rechargeable battery (not shown) for powering the apparatus when external power if external power supply is not available.

[0171] In an example embodiment, the image capture unit comprises a distance meter such as an ultrasound detector; split-pixel sensor; light phase detection; and/or image analyzer for determining distance to one or more image objects visible to the image capture units.

[0172] It is also useful to realize that the term apparatus is used in this document with varying scope. In some of the broader claims and examples, the apparatus may refer to only a subset of the features presented in FIG. 2 or even be implemented without any one of the features of FIG. 2. In one example embodiment term apparatus refers to the processor 210, an input of the processor 210 configured to receive information from the digital image capture units 260 and an output of the processor 210 configured to provide information to the viewfinder. For instance, the image processor may comprise the processor 210 and the device in question may comprise the camera processor 330 and the camera interface 280 shown in FIG. 3.

[0173] FIG. 3 shows a block diagram of an imaging unit 300 of an example embodiment of the invention. The digital image capture unit 300 comprises two offset positioned objectives 310, respective two optical image stabilizers 315 in an image stabilization unit 312, and two image sensors 320 further respective to the two objectives 310, a camera processor 330, a memory 340 comprising data such as user settings 344 and software 342 with which the camera processor 330 can manage operations of the imaging unit 300. The camera processor 330 operates as an image processing circuitry of an example embodiment. An input/output or camera interface 280 is also provided to enable exchange of information between the imaging unit 300 and the host processor 210. The image sensor 320 is, for instance, a CCD or CMOS unit. In case of a CMOS unit, the image sensor 320 can also contain built-in analog-to-digital implemented on common silicon chip with the image sensor 320. In an alternative example embodiment, a separate A/D conversion is provided between the image sensor 320 and the camera processor 330.